density which is lower than the high recording density, the distinguishing information informing that the first region of the information recording substrate has the first thickness T1.

87 (Amended). In combination with a compound objective lens according to any one of claims 133-136, an optical disk, comprising:

an information recording substrate having a thin thickness, the thin thickness of the information recording substrate being thinner than that of a compact disk;

a plurality of first recording pits placed at a first region of the information recording substrate for recording pieces of recording information at a high recording density; and

a plurality of second recording pits placed at a second region of the information recording substrate for recording pieces of distinguishing information at a low recording density, the distinguishing information informing that the first region of the information recording substrate has the thin thickness.

88 (Amended). In combination with a compound objective lens according to any one of claims 133-136, an optical disk apparatus, comprising:

rotating means for rotating an information medium which has a first thickness T1 or a second thickness T2 larger than the first thickness T1;

an optical head apparatus including the compound objective lens for reading an information signal, a focus error signal and a tracking error signal from the information medium rotated by the rotating means through the objective lens;

moving means for moving the optical head apparatus;

connecting means for connecting the rotating means and the moving means with an electric source to supply an electric power to the rotating means and the moving means;

actuating means for actuating the objective lens of the optical head apparatus;

focus control means for controlling the actuating means to perform a first focus control of the optical head apparatus corresponding to the first thickness T1 of the information medium and a second focus control of the optical head apparatus corresponding to the second thickness T2 of the information medium according to the focus error signal read by the optical head apparatus;

tracking control means for controlling the actuating means to perform a first tracking control of the optical head apparatus corresponding to the first thickness T1 of the information medium and a second tracking control of the optical head apparatus corresponding to the second

thickness T2 of the information medium according to the tracking error signal read by the optical head apparatus;

detecting means for detecting whether the information medium has the first thickness T1 or the second thickness T2; and

changing means for switching from the second focus and tracking controls performed by the focus control means and the tracking control means to the first focus and tracking controls performed by the focus control means and the tracking control means according to the detection of the detecting means.

106 (Amended). A microscope including the compound objective lens having a plurality of focal points according to any of claims 133-136, further comprising:

an ocular lens for receiving a beam of light from a plurality of planes through the lens and observing the planes, the planes being placed at a plurality of positions different in an optical axis direction.

107 (Amended). A microscope including the compound objective lens having a plurality of focal points according to any of claims 133-136, further comprising:

photographing means for receiving beam of light from a plurality of planes through the lens and photographing the planes, the planes being placed at a plurality of positions different in an optical axis direction.

108 (Amended). In combination with a compound objective lens according to any of claims 133-136, an exposing apparatus comprising:

an alignment light source for radiating a plurality of beams of alignment light to illuminate a photomask and a sample placed at different points in an optical axis direction;

said compound objective lens refracting the alignment light generated by the light source and diverging from the photomask and the sample;

light superposing means for superposing the alignment light refracted by the lens to form a beam of superposed light;

ocular lens for converging the superposed light generated by the light superposing means;

aligning means for aligning the photomask and the sample according to the superposed light photographed by the photographing means;

an exposure light for radiating a beam of exposure light; and

exposing means for exposing a photo sensitive material coated on the sample which is aligned with the photomask by the aligning means.

109 (Amended). In combination with a compound objective lens according to any of claims 133-136, an exposing apparatus comprising:

an alignment light source for radiating a plurality of beams of alignment light to illuminate a photomask and a sample placed at different points in an optical axis direction;

said compound objective lens refracting the alignment light generated by the light source and diverging from the photomask and the sample;

light superposing means for superposing the alignment light refracted by the lens to form a beam of superposed light;

photographing means for photographing the superposed light generated by the light superposing means;

aligning means for aligning the photomask and the sample according to the superposed light converged by the ocular lens;

an exposure light source for radiating a beam of exposure light; and

exposing means for exposing a photo sensitive material coated on the sample which is aligned with the photomask by the aligning means to the exposure light radiated from the exposure light source.

110. (Amended). In combination with a compound objective lens according to any of claims 133-136, an image reproducing apparatus, comprising:

rotating means for rotating an information medium which has a first thickness T1 or a second thickness T2 larger than the first thickness T1;

an optical head apparatus including the compound objective lens for converging a beam of incident light at a plurality of focal points and reading an image information signal, a focus error signal and a tracking error signal from the information medium rotated by the rotating means;

moving means for moving the optical head apparatus;

connecting means for connecting the rotating means and the moving means with an electric source to supply an electric power to the rotating means and the moving means;

actuating means for actuating the compound objective lens of the optical head apparatus;

focus control means for controlling the actuating means to perform a first focus control of the optical head apparatus corresponding to the first thickness T1 of the information medium and a second focus control of the optical head apparatus corresponding to the second thickness T2 of the information medium according to the focus error signal read by the optical head apparatus;

tracking control means for controlling the actuating means to perform a first tracking control of the optical head apparatus corresponding to the first thickness T1 of the information medium and a second tracking control of the optical head apparatus corresponding to the second thickness T2 of the information medium according to the tracking error signal read by the optical head apparatus; and

displaying means for reproducing the image information signal read by the optical head apparatus as an image.

111 (Amended). In combination with a compound objective lens according to any of claims 133-136, a voice reproducing apparatus, comprising:

rotating means for rotating an information medium which has a first thickness T1 or a second thickness T2 larger than the first thickness T1;

an optical head apparatus including the compound objective lens for converging a beam of incident light at a plurality of focal points and reading a voice information signal, a focus error signal and a tracking error signal from the information medium rotated by the rotating means;

moving means for moving the optical head apparatus;

connecting means for connecting the rotating means and the moving means with an electric source to supply an electric power to the rotating means and the moving means;

actuating means for actuating the compound objective lens of the optical head apparatus;

focus control means for controlling the actuating means to perform a first focus control of the optical head apparatus corresponding to the first thickness T1 of the information medium and a second focus control of the optical head apparatus corresponding to the second thickness T2 of the information medium according to the focus error signal read by the optical head apparatus;

tracking control means for controlling the actuating means to perform a first tracking control of the optical head apparatus corresponding to the first thickness T1 of the information medium and a second tracking control of the optical head apparatus corresponding to the second thickness T2 of the information medium according to the tracking error signal read by the optical head apparatus; and

voice reproducing means for reproducing the voice information signal read by the optical head apparatus as voices.

112 (Amended). In combination with a compound objective lens according to any of claims 133-136, an information processing apparatus, comprising:

rotating means for rotating an information medium which has a first thickness T1 or a second thickness T2 larger than the first thickness T1;

an optical head apparatus including the compound objective lens for converging a beam of incident light at a plurality of focal points and reading an information signal, a focus error signal and a tracking error signal from the information medium rotated by the rotating means;

moving means for moving the optical head apparatus;

connecting means for connecting the rotating means and the moving means with an electric source to supply an electric power to the rotating means and the moving means;

actuating means for actuating the objective lens of the optical head apparatus;

focus control means for controlling the actuating means to perform a first focus control of the optical head apparatus corresponding to the first thickness T1 of the information medium and a second focus control of the optical head apparatus corresponding to the second thickness T2 of the information medium according to the focus error signal read by the optical head apparatus;

tracking control means for controlling the actuating means to perform a first tracking control of the optical head apparatus corresponding to the first thickness T1 of the information medium and a second tracking control of the optical head apparatus corresponding to the second thickness T2 of the information medium according to the tracking error signal read by the optical head apparatus; and

information processing means for processing the information signal read by the optical head apparatus as an image.

113 (Amended). In combination with a compound objective lens according to any of claims 133-136, an optical head apparatus, comprising:

a light source for radiating a beam of incident light;

a first optical disk having a transparent substrate of a first thickness Tl and an information recording plane;

a second optical disk having a transparent substrate of a second thickness T2 lower than the first thickness T1 (T2<Tl) and an information recording plane;

the compound objective lens, partitioned into a plurality of light passing regions including a first light passing region and a second light passing region respectively corresponding to a distance from an optical axis of the beam of incident light radiated from the light source, receiving the beam of incident light radiated from the light source, converging the beam of incident light, which passes through the second light passing region and the transparent substrate of the second optical disk, at the information recording plane of the second optical disk, and converging the beam of incident light, which passes through the first light passing region and the transparent substrate of the first optical disk, at the information recording plane of the first optical disk; and

a photo detector for detecting the beam of incident light, which is converged at the information recording plane of the first optical disk and the information recording plane of the second optical disk by the objective lens and is reflected by the first optical disk and the second optical disk, to obtain first information recorded in the information recording plane of the first optical disk and second information recorded in the information recording plane of the second optical disk.

115 (Amended). In combination with a compound objective lens according to any of claims 133-136, an optical disk apparatus, comprising:

a light source for radiating a beam of incident light;

a first optical disk having a transparent substrate of a first thickness Tl and an information recording plane;

a second optical disk having a transparent substrate of a second thickness T2 lower than the first thickness Tl (T2<Tl) and an information recording plane;

rotating means for rotating the first optical disk or the second optical disk;

an optical head apparatus, which comprises

the compound objective lens, partitioned into a plurality of light passing regions including a first light passing region and a second light passing region respectively corresponding to a distance from an optical axis of the beam of incident light radiated from the light source, for receiving the beam of incident light radiated from the light source, converging the beam of incident light, which passes through the second light passing region and the transparent substrate of the second optical disk, at the information recording plane of the second optical disk, and converging the beam of incident light, which passes through the first light

passing region and the transparent substrate of the first optical disk, at the information recording plane of the first optical disk; and

a photo detector for detecting the beam of incident light which is converged at the information recording plane of the first optical disk or the information recording plane of the second optical disk by the compound objective lens and is reflected by the first optical disk or the second optical disk;

focus control means for performing a first focus control of the optical head apparatus corresponding to the first thickness Tl of the first optical disk and a second focus control of the optical head apparatus corresponding to the second thickness T2 of the second optical disk according to the beam of incident light detected by the photo detector;

tracking control means for performing a first tracking control of the optical head apparatus corresponding to the first thickness Tl of the first optical disk and a second tracking control of the optical head apparatus corresponding to the second thickness T2 of the second optical disk according to the beam of incident light detected by the photo detector; and

information detecting means for judging according to the beam of incident light detected by the photo detector of the optical head apparatus, for which the first focus control and the second focus control of the focus control means and the first tracking control and the second tracking control of the tracking control means are performed, whether the beam of incident light radiated from the light source is converged at the information recording plane of the first optical disk or the information recording plane of the second optical disk, reproducing first information recorded in the information recording plane of the first optical disk from the beam of incident light detected by the photo detector in cases where it is judged that the beam of incident light radiated from the light source is converged at the information recording plane of the first optical disk, and reproducing second information recorded in the information recording plane of the second optical disk from the beam of incident light detected by the photo detector in cases where it is judged that the beam of incident light radiated from the light source is converged at the information recording plane of the second optical disk, and

moving means for moving the optical head apparatus.

116 (Amended). In combination with a compound objective lens according to any of claims 133-136, an optical head apparatus, comprising:

a laser light source for radiating a beam of incident light;

a first information medium having an information recording plane and a transparent substrate of a first thickness T1, a thickness of the first information medium being set to Tl;

a second information medium having an information recording plane and a transparent substrate of a second thickness T2 smaller than the first thickness Tl (T2<Tl), a thickness of the second information medium being set to T2; and

a light focusing optical system, in which the compound objective lens comprises:

a first lens region, corresponding to a numerical aperture NA1, for focusing the beam of incident light radiated from the laser light source on the information recording plane of the first information medium through the transparent substrate of the first information medium as a light spot for the purpose of reading out first information from the first information medium;

a second lens region, corresponding to a numerical aperture NA2 higher than the numerical aperture NAl (NA1<NA2), for focusing the beam of incident light radiated from the laser light source on the information recording plane of the second information medium through the transparent substrate of the second information medium as a light spot for the purpose of reading out second information from the second information medium; and

a third lens region which corresponds to a numerical aperture NA3 satisfying NA1≤NA3<NA2 and is unified with the second lens region of the compound objective lens through a discontinuous plane.

122 (Amended). In combination with a compound objective lens according to any of claims 133-136, an optical disk apparatus, comprising:

a laser light source for radiating a beam of incident light;

a first information medium having an information recording plane and a transparent substrate of a first thickness Tl, a thickness of the first information medium being set to Tl;

a second information medium having an information recording plane and a transparent substrate of a second thickness T2 smaller than the first thickness Tl (T2<Tl), a thickness of the second information medium being set to T2;

rotating means for rotating the first information medium or the second information medium;

an optical head apparatus, which comprises

a light focusing optical system, in which the compound objective lens comprises:

a first lens region, corresponding to a numerical aperture NA1, for focusing the beam of incident light radiated from the laser light source on the information recording plane of the first information medium through the transparent substrate of the first information medium as a light spot for the purpose of reading out first information from the first information medium;

a second lens region, corresponding to a numerical aperture NA2 higher than the numerical aperture NAl (NA1<NA2), for focusing the beam of incident light radiated from the laser light source on the information recording plane of the second information medium through the transparent substrate of the second information medium as a light spot for the purpose of reading out second information from the second information medium; and

a third lens region which corresponds to a numerical aperture NA3 satisfying NA1≤NA3<NA2 and is unified with the second lens region of the objective lens through a discontinuous plane;

focus control means for performing a first focus control of the optical head apparatus corresponding to the first thickness Tl of the first information medium and a second focus control of the optical head apparatus corresponding to the second thickness T2 of the second information medium according to the beam of incident light detected by the photo detector;

tracking control means for performing a first tracking control of the optical head apparatus corresponding to the first thickness Tl of the first information medium and a second tracking control of the optical head apparatus corresponding to the second thickness T2 of the second information medium according to the beam of incident light detected by the photo detector; and

information detecting means for judging according to the beam of incident light detected by the photo detector of the optical head apparatus, for which the first focus control and the second focus control of the focus control means and the first tracking control and the second tracking control of the tracking control means are performed, whether the beam of incident light radiated from the light source is converged at the information recording plane of the first information medium or the information recording plane of the second information medium, reproducing the first information recorded in the information recording plane of the first information medium from the beam of incident light detected by the photo detector in cases where it is judged that the beam of incident light radiated from the light source is converged at the information recording plane of the first information medium, and reproducing the second information recorded in the information recording plane of the second information medium from

the beam of incident light detected by the photo detector in cases where it is judged that the beam of incident light radiated from the light source is converged at the information recording plane of the second information medium; and

moving means for moving the optical head apparatus.

126 (Amended). In combination with a compound objective lens according to any of claims 133-136, an optical head apparatus, comprising:

a light source for radiating a beam of incident light;

a first information medium having an information recording plane and a transparent substrate of a first thickness Tl a thickness of the first information medium being set to Tl;

a second information medium having an information recording plane and a transparent substrate of a second thickness T2 smaller than the first thickness Tl (T2<Tl), a thickness of the second information medium being set to T2;

a light focusing optical system for receiving the beam of incident light radiated from the light source and focusing the beam of incident light on the information recording plane of the first information medium or the second information medium through the transparent substrate of the first thickness T1 or the transparent substrate of the second thickness T2 to read out information recorded in the first information medium or the second information medium, the light focusing optical system comprising

a phase adjusting device, formed in a ring-band shape, for shifting a part of the beam of incident light radiated from the light source, and

wherein the compound objective lens, has a light converging performance so as to converge the beam of incident light radiated from the light source on the information recording plane of the second information medium through the transparent substrate of the second thickness T2 at a diffraction limit, for converging the beam of incident light, of which the part is shifted by the phase adjusting device, on the information recording plane of the first information medium or the second information medium through the transparent substrate of the first thickness T1 or the transparent substrate of the second thickness T2; and

a photo detector for detecting the beam of incident light, which is converged on the information recording plane of the first information medium or the information recording plane of the second information medium by the light focusing optical system and is reflect by the first information medium or the second information medium, to reproduce information recorded in the first information medium or the second information medium.

130 (Amended). A compound objective lens according to any of claims 133-136, wherein the compopund objective lens includes:P:

a first lens region, corresponding to a first numerical aperture NA1, for focusing a beam of incident light, which is radiated from a laser light source and transmits through a transparent substrate of a first information medium having a first thickness T1, to form a light spot on an information recording plane of the first information medium for the purpose of reading out information from the first information medium;

a second lens region, corresponding to a second numerical aperture NA2 higher than the first numerical aperture NA1 (NA1<NA2), for focusing the beam of incident light, which is radiated from the laser light source and transmits through a transparent substrate of a second information medium having a second thickness T2 smaller than the first thickness Tl (T2<Tl), to form a light spot on an information recording plane of the second information medium for the purpose of reading out information from the second information medium; and

a third lens region, corresponding to a numerical aperture NA4 equal to or lower than the numerical aperture NA1 (NA4≤NAl), for changing the beam of incident light radiated from the laser light source to converge the beam of incident light on the information recording plane of the first information medium through the transparent substrate of the first information medium having the first thickness T1.

131 (Amended). In combination with a compound objective lens according to any of claims 133-136, an optical head apparatus, comprising:

a laser light source for radiating a beam of incident light;

a first information medium having an information recording plane and a transparent substrate of a first thickness Tl, a thickness of the first information medium being set to Tl;

a second information medium having an information recording plane and a transparent substrate of a second thickness T2 smaller than the first thickness T1 (T2<Tl), a thickness of the second information medium being set to T2; and

a light focusing optical system, in which the compound objective lens comprises:

a first lens region, corresponding to a numerical aperture NA1, for focusing the beam of incident light radiated from the laser light source on the information recording plane of the first

information medium through the transparent substrate of the first information medium as a light spot for the purpose of reading out first information from the first information medium;

a second lens region, corresponding to a numerical aperture NA2 higher than the numerical aperture NA1 (NA1<NA2), for focusing the beam of incident light radiated from the laser light source on the information recording plane of the second information medium through the transparent substrate of the second information medium as a light spot for the purpose of reading out second information from the second information medium; and

a third lens region, corresponding to a numerical aperture NA4 equal to or lower than the numerical aperture NA1 (NA4≤NA1), for changing the beam of incident light radiated from the laser light source to converge the beam of incident light on the information recording plane of the first information medium through the transparent substrate of the first information medium having the first thickness Tl; and

a photo detector for detecting the beam of incident light, which is converged on the information recording plane of the first information medium or the information recording plane of the second information medium by the light focusing optical system and is reflect by the first information medium or the second information medium, to reproduce the first information recorded in the first information medium or the second information recorded in the second information medium.

132 (Amended). In combination with a compound objective lens according to any of claims 133-136, an optical disk apparatus, comprising:

a laser light source for radiating the beam of incident light having a particular wavelength;

a first information medium, having an information recording plane and a transparent substrate of a first thickness T1, for recording first information on the information recording plane, a thickness of the first information medium being set to T1;

a second information medium, having an information recording plane and a transparent substrate of a second thickness T2 smaller than the first thickness Tl (T2<Tl), for recording second information on the information recording plane, a thickness of the second information medium being set to T2;

rotating means for rotating the first information medium or the second information medium;

an optical head apparatus, which comprises

a light focusing optical system, in which the compound objective lens comprises:

a first lens region, corresponding to a numerical aperture NA1, for focusing the beam of incident light radiated from the laser light source on the information recording plane of the first information medium through the transparent substrate of the first information medium as a light spot for the purpose of reading out first information from the first information medium;

a second lens region, corresponding to a numerical aperture NA2 higher than the numerical aperture NAl (NA1<NA2), for focusing the beam of incident light radiated from the laser light source on the information recording plane of the second information medium through the transparent substrate of the second information medium as a light spot for the purpose of reading out second information from the second information medium; and

a third lens region, corresponding to a numerical aperture NA4 equal to or lower than the numerical aperture NA1 (NA4≤NAl), for changing the beam of incident light radiated from the laser light source to converge the beam of incident light on the information recording plane of the first information medium through the transparent substrate of the first information medium having the first thickness Tl;

focus control means for performing a first focus control of the optical head apparatus corresponding to the first thickness Tl of the first information medium and a second focus control of the optical head apparatus corresponding to the second thickness T2 of the second information medium according to the beam of incident light detected by the photo detector;

tracking control means for performing a first tracking control of the optical head apparatus corresponding to the first thickness Tl of the first information medium and a second tracking control of the optical head apparatus corresponding to the second thickness T2 of the second information medium according to the beam of incident light detected by the photo detector; and

information detecting means for judging according to the beam of incident light detected by the photo detector of the optical head apparatus, for which the first focus control and the second focus control of the focus control means and the first tracking control and the second tracking control of the tracking control means are performed, whether the beam of incident light radiated from the light source is converged at the information recording plane of the first information medium or the information recording plane of the second information medium, reproducing the first information recorded in the information recording plane of the first

information medium from the beam of incident light detected by the photo detector in cases where it is judged that the beam of incident light radiated from the light source is converged at the information recording plane of the first information medium, and reproducing the second information recorded in the information recording plane of the second information medium from the beam of incident light detected by the photo detector in cases where it is judged that the beam of incident light radiated from the light source is converged at the information recording plane of the second information medium; and

moving means for moving the optical head apparatus.

133 (New). A compound objective lens, in which a light beam passes through a portion of the lens onto an optical disk placed apart from the lens, wherein

the portion of the lens is divided into a plurality of regions including at least a first region and a second region depending on differences in distance from an optical axis of the light beam,

the first region being optimized so that a light beam passing the first region converges onto an optical disk of a first thickness T1,

the second region being optimized so that a light beam passing the second region is converged onto any of the optical disk of the first thickness T1 and an optical disk of a second thickness T2 larger than the thickness T1 (T2>T1), the second region including a hologram, and

a relationship of NA2<NA1 being satisfied by locating the first region at a position farther from the optical axis than a position of the second region, where NA1 and NA2 are numeral apertures of the lens that permit the light beam to converge onto the optical disk of the thicknesses T1 and T2, respectively.

134 (New). A compound objective lens receiving a beam of incident light, comprising:

a refraction type of lens passing the beam therethrough and providing a refracted light beam; and

a concentric circle relief type of lens, which is placed to receive either the beam of incident light or the refracted light beam, for performing phase modulation on the beam received thereby so as to meet the relationships of

T1<T2 and NA1>NA2,

wherein a numerical aperture required when the beam is converged at a first focal point after the refraction type of lens, on an optical disk having a thickness of T1 is NA1 and a further numerical aperture required when the beam is converged at a second focal point, after the refraction type of lens, on a further optical disk having a thickness of T2 is NA2, respectively.

135 (New). A compound objective lens receiving an incident beam light, comprising:

a refraction type of lens adapted to pass the beam therethrough and to provide a refracted light beam; and

a second lens receiving either the incident light beam or the refracted light beam and adapted to perform phase modulation on a beam received thereby so as to meet the relationships of

T1<T2 and NA1>NA2,

wherein a numerical aperture required when the beam received by the second lens is converged at a first focal point on a first receiving object having a thickness of T1 is NA1 and a numerical aperture required when the beam received by the second lens is converged at a second focal point on a further receiving object having a thickness of T2 is NA2.

136 (New). A compound objective lens receiving a beam of incident light, comprising:

a refraction type of lens passing the beam therethrough and providing a refracted light beam; and

a concentric circle relief type of lens, which is placed to receive either the beam of incident light or the refracted light beam, for performing phase modulation on the beam received thereby so as to converge the received light beam at different focal points,

wherein one of the focal points is equal to or higher than 0.6.

137 (New). The compound objective lens according to claim 133, wherein the first region includes a further hologram.

138 (New). The compound objective lens according to claim 133, wherein the lens includes a region excluding a hologram.

139 (New). An optical head apparatus including the compound objective lens according to any one of claims 133-136 for performing at least one of recording and reproduction of pieces of information on to and from an optical disk placed to face the optical

head apparatus, the optical disk including a first transparent substrate of thickness T1 and a second transparent substrate of thickness T2, comprising:

an optical source for radiating a light beam;

wherein the compound objective lens receives the light beam radiated by the optical source so as to converge the light beam at micro-spots on the first and second substrates of the optical disk, and wherein the compound objective lens includes

a first region optimized so that the light beam passing the first region converges at the micro-spots on the first substrate of smaller thickness of the optical disk,

a second region optimized so that the light beam passing the second region is converged at the micro-spots on any of the first and second substrates of the optical disk, the second region including a hologram, and wherein

NA1 and NA2 are numeral apertures of the lens that permit the light beam to converge at the micro-spots on the first and second substrates of the optical disk, respectively.

140 (New) An optical disk apparatus including the compound objective lens according to any one of claims 133-136, comprising:

(a): an optical head apparatus placed to face an optical disk including a first transparent substrate of thickness T1 and a second transparent substrate of thickness T2, the optical head apparatus including:

(i): an optical source for radiating a light beam;

(ii): the compound objective lens receiving the light beam radiated by the optical source so as to converge the light beam at micro-spots on the first and second substrates of the optical disk, wherein the compound objective lens includes

a first region optimized so that the light beam passing the first region converges at the micro-spots on the first substrate of smaller thickness of the optical disk,

a second region optimized so that the light beam passing the second region is converged at the micro-spots on any of the first and second substrates of the optical disk, the second region including a hologram, and wherein

NA1 and NA2 are numeral apertures of the lens that permit the light beam to converge at the micro-spots on the first and second substrates of the optical disk, respectively, whereby T2>T1 and NA2<NA1;

(iii): focus control means for controlling focuses of the optical head apparatus correspondingly to the thicknesses of the substrates on the basis of the light beam, the focuses being realized by the convergence of the light beam passing the first and second regions of the compound objective lens;

(iv): tracking control means for performing a tracking control of the optical head apparatus correspondingly to the thicknesses of the substrates on the basis of the light beam; and

(v): information detecting means for determining whether each of the substrates is of thickness T1 or T2 and detecting pieces of information recorded on each determined substrate on the basis of the light beam;

(b): moving means for moving the optical head apparatus;

(c): rotating means for rotating the optical disk; and

(d): reproducing means for reproducing the pieces of information detected by the information detecting means upon a move of the optical head apparatus caused by the moving means and a rotation of the optical disk caused by the rotating means.

141 (New). An optical disk information equipment including the compound objective lens according to any one of claims 133-136, comprising:

(1) an optical disk apparatus, including:

(a): an optical head apparatus placed to face an optical disk including a first transparent substrate of thickness T1 and a second transparent substrate of thickness T2, the optical head apparatus having:

(i): an optical source for radiating a light beam;

(ii): the compound objective lens receiving the light beam radiated by the optical source so as to converge the light beam at micro-spots on the first and second substrates of the optical disk, wherein the compound objective lens includes

a first region optimized so that the light beam passing the first region converges at the micro-spots on the first substrate of smaller thickness of the optical disk,

a second region optimized so that the light beam passing the second region is converged at the micro-spots on any of the first and second substrates of the optical disk, the second region including a hologram, and wherein

NA1 and NA2 are numeral apertures of the lens that permit the light beam to converge at the micro-spots on the first and second substrates of the optical disk, respectively, whereby T2>T1 and NA2<NA1;

(iii): focus control means for controlling focuses of the optical head apparatus correspondingly to the thicknesses of the substrates on the basis of the light beam, the focuses being realized by the convergence of the light beam passing the first and second regions of the compound objective lens;

(iv): tracking control means for performing a tracking control of the optical head apparatus correspondingly to the thicknesses of the substrates on the basis of the light beam; and

(v): information detecting means for determining whether each of the substrates is of thickness T1 or T2 and detecting pieces of information recorded on each determined substrate on the basis of the light beam;

(b): moving means for moving the optical head apparatus;

(c): rotating means for rotating the optical disk; and

(d): reproducing means for reproducing the pieces of information detected by the information detecting means upon a move of the optical head apparatus caused by the moving means and a rotation of the optical disk caused by the rotating means; and

(2) : an image signal generator for generating an image signal based on the reproduced pieces of information.

142 (New). A computer system including the compound objective lens according to any one of claims 133-136, comprising:

(1): optical disk apparatus, comprising:

(a): an optical head apparatus placed to face an optical disk including a first transparent substrate of thickness T1 and a second transparent substrate of thickness T2, the optical head apparatus including:

(i): an optical source for radiating a light beam;

(ii): the compound objective lens receiving the light beam radiated by the optical source so as to converge the light beam at micro-spots on the first and second substrates of the optical disk, wherein the compound objective lens includes

a first region optimized so that the light beam passing the first region converges at the micro-spots on the first substrate of smaller thickness of the optical disk,

a second region optimized so that the light beam passing the second region is converged at the micro-spots on any of the first and second substrates of the optical disk, the second region including a hologram, and wherein

NA1 and NA2 are numeral apertures of the lens that permit the light beam to converge at the micro-spots on the first and second substrates of the optical disk, respectively, whereby T2>T1 and NA2<NA1;

(iii): focus control means for controlling focuses of the optical head apparatus correspondingly to the thicknesses of the substrates on the basis of the light beam, the focuses being realized by the convergence of the light beam passing the first and second regions of the compound objective lens;

(iv) tracking control means for performing a tracking control of the optical head apparatus correspondingly to the thicknesses of the substrates on the basis of the light beam; and

(v) information detecting means for determining whether each of the substrates is of thickness T1 or T2 and detecting pieces of information recorded on each determined substrate on the basis of the light beam;

(b): moving means for moving the optical head apparatus;

(c): rotating means for rotating the optical disk; and

(d): reproducing means for reproducing the pieces of information detected by the information detecting means upon a move of the optical head apparatus caused by the moving means and a rotation of the optical disk caused by the rotating means;

(2): a signal inputting unit for inputting pieces of information to be recorded on the substrates;

(3): a central processing unit for processing the pieces of information recorded on the substrates and processing the pieces of information to be recorded on the substrates; and

(4): a signal outputting unit for outputting the pieces of information recorded on the substrates.

143 (New). The compound objective lens according to any one of claims 133-136, configured for converging an incident light beam onto an optical disk including a first optical disk of thickness T1 and a second optical disk of thickness T2, comprising:

a numerical aperture changer for satisfying the relationship NA2<NA1, in which NA2 is a numeral aperture of the second region to make the light beam converge onto the second optical disk and NA1 is a numeral aperture of a region comprising the first region and the second region to make the light beam converge onto the first optical disk.

144 (New). An optical head apparatus including the compound objective lens according to any one of claims 133-136 for performing at least one of recording and reproduction of pieces of information on to and from an optical disk placed to face the optical head apparatus, the optical disk including a first transparent substrate of thickness T1 and a second transparent substrate of thickness T2, the optical head apparatus comprising:

an optical source for radiating a light beam; and

the compound objective lens receiving the light beam radiated by the optical source so as to converge the light beam at micro-spots on the first and second substrates of the optical disk; and including first and second regions passing the light beam so that a numerical aperture changer satisfies the relationship NA2<NA1, in which NA2 is a numeral aperture of the second region to make the light beam converge onto the second optical disk and NA1 is a numeral aperture of a region comprising the first region and the second region to make the light beam converge onto the first optical disk.

145 (New). An optical disk apparatus including the compound objective lens according to any one of claims 133-136, comprising:

(a): an optical head apparatus placed to face an optical disk including a first transparent substrate of thickness T1 and a second transparent substrate of thickness T2, the optical head apparatus comprising:

(i): an optical source for radiating a light beam;

(ii): the compound objective lens receiving the light beam radiated by the optical source so as to converge the light beam at micro-spots on the first and second substrates of the optical disk and including first and second regions passing the light beam so that a numerical aperture changer satisfies the relationship NA2<NA1, in which NA2 is a numeral aperture of the second region to make the light beam converge onto the second optical disk and NA1 is a numeral aperture of a region comprising the first region and the second region to make the light beam converge onto the first optical disk;

(iii): focus control means for controlling focuses of the optical head apparatus correspondingly to the thicknesses of the substrates on the basis of the light beam, the focuses being realized by the convergence of the light beam passing the first and second regions of the compound objective lens;

(iv): tracking control means for performing a tracking control of the optical head apparatus correspondingly to the thicknesses of the substrates on the basis of the light beam; and

(v): information detecting means for determining whether each of the substrates is of thickness T1 or T2 and detecting pieces of information recorded on each determined substrate on the basis of the light beam;

(b): moving means for moving the optical head apparatus;

(c): rotating means for rotating the optical disk; and

(d): reproducing means for reproducing the pieces of information detected by the information detecting means upon a move of the optical head apparatus caused by the moving means and a rotation of the optical disk caused by the rotating means.

146 (New). An optical disk information equipment including the compound objective lens according to any one of claims 133-136, comprising:

(1) an optical disk apparatus, including:

(a): an optical head apparatus placed to face an optical disk including a first transparent substrate of thickness T1 and a second transparent substrate of thickness T2, the optical head apparatus comprising:

(i): an optical source for radiating a light beam;

(ii): the compound objective lens receiving the light beam radiated by the optical source so as to converge the light beam at micro-spots on the first and second substrates of the optical disk, the compound objective lens including first and second regions passing the light beam so that a numerical aperture changer satisfies the relationship NA2<NA1, in which NA2 is a numeral aperture of the second region to make the light beam converge onto the second optical disk and NA1 is a numeral aperture of a region comprising the first region and the second region to make the light beam converge onto the first optical disk;

(iii): focus control means for controlling focuses of the optical head apparatus correspondingly to the thicknesses of the substrates on the basis of the light beam, the focuses being realized by the convergence of the light beam passing the first and second regions of the compound objective lens;

(iv): tracking control means for performing a tracking control of the optical head apparatus correspondingly to the thicknesses of the substrates on the basis of the light beam; and

(v): information detecting means for determining whether each of the substrates is of thickness T1 or T2 and detecting pieces of information recorded on each determined substrate on the basis of the light beam;

(b): moving means for moving the optical head apparatus;

(c): rotating means for rotating the optical disk; and

(d): reproducing means for reproducing the pieces of information detected by the information detecting means upon a move of the optical head apparatus caused by the moving means and a rotation of the optical disk caused by the rotating means; and

(2): an image signal generator for generating an image signal based on the reproduced pieces of information.

147 (New). A computer system including the compound objective lens according to any one of claims 133-136, comprising:

(1) an optical disk apparatus, including:

(a): an optical head apparatus placed to face an optical disk including a first transparent substrate of thickness T1 and a second transparent substrate of thickness T2, the optical head apparatus comprising:

(i): an optical source for radiating a light beam;

(ii): the compound objective lens receiving the light beam radiated by the optical source so as to converge the light beam at micro-spots on the first and second substrates of the optical disk, the compound objective lens including first and second regions passing the light beam so that a numerical aperture changer satisfies the relationship NA2<NA1, in which NA2 is a numeral aperture of the second region to make the light beam converge onto the second optical disk and NA1 is a numeral aperture of a region comprising the first region and the second region to make the light beam converge onto the first optical disk;

(iii): focus control means for controlling focuses of the optical head apparatus correspondingly to the thicknesses of the substrates on the basis of the light beam, the focuses being realized by the convergence of the light beam passing the first and second regions of the compound objective lens;

(iv): tracking control means for performing a tracking control of the optical head apparatus correspondingly to the thicknesses of the substrates on the basis of the light beam; and

(v): information detecting means for determining whether each of the substrates is of thickness T1 or T2 and detecting pieces of information recorded on each determined substrate on the basis of the light beam;

(b): moving means for moving the optical head apparatus;

(c): rotating means for rotating the optical disk; and

(d): reproducing means for reproducing the pieces of information detected by the information detecting means upon a move of the optical head apparatus caused by the moving means and a rotation of the optical disk caused by the rotating means;

(2): a signal inputting unit for inputting pieces of information to be recorded on the substrates;

(3): a central processing unit for processing the pieces of information recorded on the substrates and processing the pieces of information to be recorded on the substrates; and

(4): a signal outputting unit for outputting the pieces of information recorded on the substrates.